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ABSTRACT

This paper discusses the main analytical techniques used in "Mapping Educational Research and Its Impact on Schools." The study considered the impact of the outcomes of educational research on the practice of teaching and learning in Australian schools and on educational policy and administration. Mixed methods were used, beginning with a review of the literature and the exploration of the Australian Education Index (AEI) educational research database. Documents were collected from faculties of education in Australia, and questionnaires about the use of educational literature were developed for postgraduate students (n=1,267), school principals (n=73), and representatives of 72 professional associations. Interviews were then conducted with seven policymakers and selected respondents to the postgraduate student questionnaires. The study indicates that it is possible to use an existing database to monitor educational research in Australia. A clear majority of all three groups surveyed provided evidence of the awareness, acceptance, and valuing of educational research in Australia. Interviews with policymakers also showed the use of educational research in policy formation. The multiple perspectives of this study give a picture of the links between research and its use in schools and departments of education in Australia. An appendix summarizes the database descriptors from the database investigation. (Contains 3 tables, 3 figures, and 34 references.) (SLD)

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MAPPING EDUCATIONAL RESEARCH AND EXPLORING RESEARCH IMPACT: A HOLISTIC, MULTI-METHOD APPROACH *

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* *Mapping Educational Research and its Impact on Schools* was one of three studies of the *Impact of Educational Research* commissioned and funded by the Australian Federal Department of Education, Training and Youth Affairs in 1999 (Minister: The Honourable Dr David Kemp MP).

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MAPPING EDUCATIONAL RESEARCH AND EXPLORING RESEARCH IMPACT: A HOLISTIC, MULTI-METHOD APPROACH

INTRODUCTION

This paper discusses the main analytical techniques used in a recent study of the output of educational research and its impact on schools. This study is the first of its kind conducted in Australia and embodies some unique features which are discussed in detail in the paper. Not only are the details important for understanding the findings generated by the study, but they may also be of interest to those contemplating similar analyses of educational research in other countries or school systems. It was found that educational research in Australia is more vibrant, and more widely used in schools than many in the field had initially supposed.

In the United States of America, the United Kingdom and Australia an intense interest in the impact of educational research has emerged in recent years although in each country the context is somewhat different (Blackmore and Lingard 1998, Hargreaves 1998, Hegarty 1997, Hillage et al 1998, McGaw et al 1992, NERPPB 1998, NRC 1999, PCAST 1997, Rudduck & McIntyre 1998, Selby-Smith et al 1998). In the United States of America, the focus appears to be on a perceived failure of large research projects to yield generalisable and sustainable results; a sense of failure within urban schools, and the difficulty of implementing the results of research in a large, decentralised system of education. In Britain concern with the impact of educational research appears to be related to a determination to reform education and raise educational achievement in comparison with that of other countries. In Australia the source of the focus on research impact is less clear, but appears to be linked to a desire to improve practice and to increase the return to investment in research. Foremost among concerns are the quality of educational research and whether or not unsubstantiated findings and fads are driving educational change.

There is a common interest in establishing the most effective ways to support, coordinate, prioritise, and evaluate research and there is widespread concern to understand the processes through which new knowledge based on rigorous enquiry is generated, disseminated and utilised. This is in the context of the explosion of knowledge as policy makers, managers and practitioners seek to integrate research into other forms of usable knowledge (Lindblom & Cohen 1979, Backer 1993, Davenport 1997).

In mid-1998, in Australia the Federal Department of Education, Training and Youth Affairs sought, through competitive tender, to investigate the impact of educational research in Australia, more particularly the impact of research emanating from the university sector. It was evident from the nature of the brief that the questions had been influenced by a relatively recent discipline review of education in Australia (McGaw et al 1992), and a number of investigations into research use from the United Kingdom (Kerr et al 1997, Tooley & Darby 1997, Hillage et al 1998). The investigation extended from late 1998 through to late1999. The findings have not yet been released to the general public which explains why this paper provides a limited discussion of results. It needs to be noted that instead of one single study DETYA decided to commission four complementary studies from four different research teams. One study involved citation analysis. Another study explored teachers' application of research knowledge in classroom teaching. Yet another study undertook to trace major policy initiatives in education and their connection with research findings. The base-line study, the one reported here, sought to map total research activity, and explore the outcome of research from some hitherto unexamined perspectives.

THE AUSTRALIAN RESEARCH CONTEXT

The university sector in Australia is the single largest producer of educational research studies, and that sector is largely government funded. Within the university sector a substantial proportion of the research

effort in person-years is attributable to postgraduate research students. [1] In Education, many of these are part-time students and are also practising teachers and administrators.

Education, like other areas of public policy in Australia, has come under greater scrutiny since the early 1980s. Changes in the university sector have accompanied its expansion and have included modifications to systems for the distribution and control of funds and the introduction of more explicit forms of accountability involving systematic data collection. One example of such data collection in the research context has been the Research Quantum Publications Collection (RQPC). The RQPC is an output measure introduced in 1994 that includes research and scholarly publications produced by staff and students (NBEET, 1997). 'Discipline reviews' have also been instituted. One of the first discipline fields to be reviewed was educational research, leading to the publication of Educational Research in Australia (McGaw et al 1992). The report examined the structure, organisation, funding and priorities of Australian educational research. A similar analysis and set of recommendations was developed for research on vocational education and training (VET) in Australia by McDonald et al (1993).

A key conclusion of the 1992 review was that while Australian education research exhibited many strengths and much excellent work was being done, the whole enterprise was a fragile resource that required reorientation and increased support if it was to contribute more effectively to the challenge of improving Australian education. The report made a range of recommendations for improving the dissemination and application of research. These were built around the key idea of more closely integrating researchers, funding agencies and the users of research in the processes of identifying research priorities, conducting research, and monitoring its uptake and impact. The report also pointed to the need for a better understanding of research impact – that is whether research is used, what kinds of research are influential, and what forms of interaction are most effective. Submissions to the review panel had suggested there was widespread suspicion or dismissal of research within the practitioner and policy-maker communities, and that researchers had to take the needs of those groups more into account and work more closely with them.

It was argued that one of the major constraints on the effectiveness of educational research was its fragmented nature. Overall resources were low, research for most academics was a part-time activity fitted around other pressing demands, and there were few instances of sustained programs of research as opposed to small-scale individual projects. It concluded that one way to address the issues of relevance and effectiveness was priority setting and a concentration of research effort, especially more extensive use of teams of researchers, and research centres. With the exception of research on VET, this has not occurred at a systemic level, although there are many individual examples of universities and academics developing more effective relationships with schools and educational authorities during the 1990s. As a result of a recent governmental paper (DETYA 2000), it appears that future research funding may come to depend on restructuring of this kind.

[1] The Australian Bureau of Statistics undertakes a biennial collection of research statistics. For 1996-1997 (the most recent available data), an estimated 2933 person years were devoted to educational research and development in Australia (representing well under one percent of the total number of people employed in education and training). In recent years there has been substantial growth in the estimated total person years allocated to R & D in education and training (2.6 times over the decade), almost all within the higher education sector (96 per cent). Within the higher education sector the most substantial growth has occurred in the person years allocated by postgraduate students (1725 person years or a 4.5 times increase over the decade). The number of academic staff years estimated to be allocated to educational R & D almost doubled between 1986 and 1992, possibly due in large part to the integration of colleges of advanced education into the university system. Since 1992 the number of academic staff person years allocated to educational R & D (843 person years) is estimated to have declined by over 20 per cent. The proportion of total person-years allocated to educational R & D by academic staff in 1996 (22 per cent) is the lowest in a decade.

The review raised serious questions about research use, but empirical research in the area has been relatively limited until now. Common reasons suggested for low levels of research use include poor or inappropriate dissemination of research findings, alienating language and alien concepts, poorly targeted and inapplicable research findings, and problems associated with different 'cultures' including the receptiveness and knowledge of potential users (Kennedy 1997).

THE SPECIFIC OBJECTIVES OF THE STUDY

The primary focus for the study is research related to schooling. Schools are the largest single sector of Australian education, enrolling 3.2 million students, employing over 260,000 full-time equivalent staff, and involving more than $12 billion expenditure per year.

In examining the impact of educational research, an important set of initial questions concerns knowledge generation: what research is being done, by whom, in what degree of concentration, and to what ends? A further set of issues concerns how the knowledge that is created makes a difference in school settings and policy-making. These issues in turn revolve around the ways in which research knowledge is obtained, translated, dispersed, and applied. The design was refined around better understanding these elements in the context of Australian schools.

Defining research

A preliminary step in the study was establishing a clear definition of research. This task was approached by way of exploring different models of systematic educational enquiry. There are a number of general definitions of research in current use. McGaw refers to the definition in the OECD's Frascati Manual:

> Creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications.
>
> (OECD 1992, 29 cited in McGaw 1996, 59)

Hillage et al (1998) elaborate this general definition of research in the context of education:

> It seems to be sensible to regard educational research as that set of activities which involves the systematic collection and analysis of data with a view to producing valid knowledge about teaching, learning and the institutional frameworks in which they occur.
>
> (Hillage et al, 1998, 7)

Taking a traditional perspective, the creation of educational knowledge can be viewed in terms of academic educational and related research, defined by what educational researchers traditionally undertake within universities, often without direct and immediate application in the field. This includes the creation of new knowledge by staff and students in the process of undertaking higher degree work.[2] However, an overview of recent practice and the literature relating to Australia and to countries with comparable cultures shows that new educational knowledge comes in various forms as well as

[2] A review of successful Australian Research Council (ARC) grants in the field of education from 1989-93 classified the work of university researchers into three categories. These were: [1] 'natural science' investigation; [2] interpretive studies, and [3] interventions and evaluations. The first two categories are consistent with this perspective, and studies in the two categories accounted for approximately 80% of ARC funding for educational research during the 1989-1993 period.

emanating from diverse sources (Gibbons et al. 1994). For this reason *systematic educational enquiry* was used in the project to encompass a wider range of modes of knowledge production.

In addition to 'traditional' research systematic educational enquiry also includes:

> Rigorous systematic investigatory work, such as policy analysis and research, policy and program evaluation, which may be undertaken in conjunction with policy makers and practitioners; and
>
> The creation of products or innovations designed to solve educational problems which have their basis in the creative processes described above.

There are four models of systematic educational enquiry which have current relevance to the impact of educational research in Australia, and which help shape the forms of interaction between researchers, policy makers and practitioners (Owen, 1998). They are

1. Traditional knowledge production
2. Investigator controlled applied research
3. Investigator-user linkages
4. User-oriented action research

There is no opportunity to expand on the four here, however it should be noted that the identification of these groups, and their implications for knowledge dissemination and use, was an important strand of investigation in the analyses.

The study addressed a range of elements with particular reference to faculties of education in Australian universities. The elements can be grouped for ease of reference into: 'mapping the research field and the relative contribution of university faculties of education'; 'research outcomes and applications'; and 'securing optimal impact'.

Mapping the Research Field

It was intended that the study would examine the *total research activity of education faculties in Australian universities*. Total activity was taken to extend to research students as well as staff. Individual institutions were not the specific subject of study, although various sub-groups of institutions were used in the analyses. Within this component of the project it was expected that the study would assess the strengths and weaknesses of educational research in Australian universities.

Research Outcomes and Applications

It was intended that the study would describe and evaluate the impact of the outcomes of educational research on the practice of teaching and learning in schools, as well as on educational policy and administration. The brief also sought to obtain evaluation of the impact and performance of educational research in terms of *the Common and Agreed National Goals for Schooling* (MCEETYA, 1999) and competencies such as literacy and numeracy.

An assessment of the appropriateness of the various modes and foci of educational research (taken to mean research topics and approaches) in relation to these goals was intended. In addition the study was to consider the extent to which research in areas not directly founded on pedagogy, such as the sociology of education, has contributed to improvements in teaching and learning and educational administration.

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Securing Optimal Impact

In relation to optimising the impact of educational research the intention was to:

> assess the extent of collaboration between educational researchers and the teaching profession and pathways for disseminating research findings and outcomes;
>
> assess the opportunities for priority setting and co-ordination mechanisms in research planning to improve the flow-on benefits from educational research to practice;
>
> examine the effectiveness of the discipline [field of Education] in meeting the needs of practitioners and policy makers; and
>
> consider the implications for educational research of emerging modes of delivery in teaching practice.

METHODOLOGY

The research conducted could be described as being of mixed methodology, utilising a blend of qualitative and quantitative methods. A research design was developed whereby each data collection phase drew on a previous one. The design may be visualised as having a pyramid structure, starting very broadly with respect to mapping the field (the base of the pyramid) and ending up with the analysis of linking items across questionnaires and interviews (see Figure 1). As one moves up the pyramid the focus begins to intensify on the elements relating to the impact of research on schools.

The design was finalised after the first review of the literature. What became clear almost immediately was that a methodology for mapping the field had to be devised that could be reproduced and re-used if the longer-term benefits of the study were to be maximised. There needs to be an effective and reliable way to continue to chart trends in research over a long period of time, given that regular statistical collections generally provide no detailed information on individual research topics. The mapping work initiated by the study involved extensive analyses of the material catalogued by ACER in the Australian Education Index (AEI), and the reports of research output prepared on an annual basis by faculties of education.

The intention was to build on earlier approaches to investigating research use and usefulness such as McGaw et al (1992). It became clear that there were gaps in the literature about the impact of some university research, for example, there was little information about postgraduate research work. If, as could be anticipated, the nature of the data allowed no more than tentative findings about the extent of impact, there was nonetheless, an opportunity to obtain robust information about perceptions of impact, and avenues for impact in school and policy settings. Such data were collected from samples of post-graduate students in faculties of education, professional associations involved in education, school principals, and senior policy makers in school systems.

The questions asked of each group were designed to obtain specific information about:

> How research is defined and why;
>
> Educational innovations and their source;
>
> Receptiveness to research findings;
>
> Responsiveness of researchers and their links with schools and policy makers;
>
> The intended use of postgraduate and commissioned research projects;
>
> The role of different organisations in disseminating research findings; and
>
> The uses of knowledge gained in the course of higher degree studies.

Linking Items & Synthesis
Policy document Analysis
Interviews with key policy personnel in each state
Interviews with a small group of teachers & administrators engaged in personal research projects at universities
Telephone survey of a sample of school principals in Victoria, Queensland and Western Australia
national professional associations questionnaire sent to all associationslisted in the Directory of Education
postgraduate student questionnaire sent to all universities with a Faculty of education or equivalent
Document collection from all faculties of education or equivalent plus a brief telephone interview/questionnaire
Literature review, use of existing statistical collections and pertinent government reports, plus an exhaustive analysis of the entries in the Australian Education Index database

Figure 1. A Visual Representation of the Structure of the Study

Much new ground needed to be broken in order to answer the research questions. Because of the scope of the study and the multi-disciplinary nature of the research team, it was possible to develop a holistic approach to the exploration of research impact. Some features of note included:

- an extensive literature review that paid particular attention to the scope and meaning of research in education and the relation between different forms of knowledge creation and research dissemination and use. The four-model definition outlined above was utilised in the conceptualisation and development of the other instruments used in the study.

- use of the AEI databases spanning the period1984-97, using the whole data base in some instances and very fine-grained searching techniques in others. The latter was used particularly when attempting to obtain information on the research effort in areas identified in the *Common and*

Agreed National Goals for Schooling. (For example, to explore the extent of research in civics and citizenship, and indigenous education.)

- Collection of documentation from Faculties of Education for 1997 and approval for administration of a postgraduate questionnaire. The study obtained the voluntary involvement of every education faculty or equivalent in the country.

- Development of coding procedures to allow a comparison of Faculty and AEI data and use of the same procedures to code certain items across questionnaires.

- Development and trial of three questionnaires (postgraduate students, school principals, and professional associations) with linking items.

- Completion of two sets of interviews (policy makers and selected respondents to the postgraduate questionnaire).

- An analysis of types of 'link' between Faculty of Education, school, community, enterprises and other bodies drawn from Faculty handbooks, newsletters and other internal sources.

- A design that addressed threats to validity through trials of instruments, establishing inter-rater reliability, checks of accuracy between complementary data sets, follow-up on missing data, a pre-established framework of common items and themes and peer and member checking. To facilitate the latter, 25 postgraduate students, including a number of principals, were identified using the postgraduate questionnaire, and interviews were obtained with 24 of them.

It would be impossible to provide all the details plus comments on the different methods used in this one paper. As a result the decision has been made to focus on (1) the details and issues associated with mapping educational research and especially research conducted in faculties of education because the approach that was devised is unique, and (2) on the three questionnaires, with particular emphasis on the linking items, and the interviews with policy makers.

MAPPING RESEARCH

The task was to investigate the total research output of universities from publications to minor research projects and there was no comprehensive data base of this information in existence. If a data base was to be created, there was then the need for a way to establish its trustworthiness. One solution was to gain an accurate picture of key research outputs, such as publications, in order to generate a baseline for comparison. This was theoretically possible from the outset, because while Australia has a large educational research output, it is still small enough to be able to be mapped comprehensively over an extended time frame - something larger nations would find difficult to achieve. One thing was clear, a mapping exercise undertaken now in such depth, had to be designed in such a way as to be relatively easy to repeat in the future in order to enable research monitoring to continue.

In the UK recently there was an attempt to devise codes for mapping research publications but the task proved problematic mainly because without a whole article or abstract and the opportunity to use multiple codes, it is difficult to produce an effective mapping method. Educational research is multidimensional - directed at various levels, using different methods, and often multi-focussed (Kerr et al 1998). Moreover, research documentation is varied, which creates further difficulties for monitoring over time. The solution in Australia was to adapt an existing and acknowledged method of identifying research studies that accounted for all the above.

The most comprehensive source of information about research in Australia is the national education database,[3] better known as the Australian Education Index (AEI) which also includes the Bibliography of Education Theses in Australia (BETA). The AEI is one of the largest Australian indexing services, indexing 4000-5000 items each year.[4] It is one of the many indexes internationally, among them the ERIC index compiled by the Educational Resources Information Center USA, and the British Education Index. Each index tends to have its own national focus, therefore the periodicals and materials accessed for the AEI do not overlap to any great extent with other nationally based indexes such as ERIC.

The AEI databases comprise the only source of comparable, longitudinal information on educational research output, yet the AEI was not designed for mapping activity.[5] The change in focus from searching to mapping required the intensive input of expert indexing personnel. The database proved very adaptable and while the activity was exceptionally time-consuming it was not unduly difficult, and raised interesting historical issues about the construction of the index and future indexing practices, especially if monitoring of research is to continue (Holbrook, Findlay & Misson 1999).

The data-base phase

The data-base phase had a threefold purpose within the context of the overall aims for the study. The main purpose was to produce comprehensive and reliable information about research activity in Australia, and so provide a clear reference point regarding the state of play at a time when strategic decisions were about to be made about education and research funding (DETYA 2000).

Given the structure of the indexes and procedures already in place it was possible to report on the AEI data in two ways, by main descriptor group (see discussion below) and by broad subject categories based on a UNESCO typology. [6] One of the most striking findings associated with the broad subject categories was that postgraduate students were more likely to focus their research on discipline areas such as educational psychology or sociology than were university staff and that, in particular, there were more theses focused on educational psychology (Holbrook & Findlay, 1999).

The second purpose was to address how best to use the existing databases in order to be able to engage in more detailed analyses as the need emerged during the project (and after). For example, the need arose, for cross-validation purposes, to distinguish in PhD projects by certain classifications (e.g.,

[3] In recent years there have also been limited collections of research and publications information by government agencies for auditing purposes.

[4] The education librarians responsible for the AEI draw on a core of more than 180 periodicals and regularly published materials, plus they attempt to incorporate books, reports, resources, conferences, papers and electronic documents that are published in Australia, about Australian education or by Australian educational researchers. In short the core includes ALL Australian education journals and those foreign journals (many of which were once Australian owned) with a substantial Australian presence on the editorial board. The indexers may choose not to index every item in a journal, for example editorial material or book reviews. They locate articles published outside Australia if these articles fall within their core education periodical search. On average about five descriptors are allocated to each document, although this may range from three to eight depending on the complexity and availability of descriptors, and the subject scope of the document.

[5] Subject indexing is undertaken 'primarily in order that the user may effectively retrieve specified information'. 'Two basic indexing rules take precedence over all others', namely, 'index only what is in the document' and at the 'level of specificity of the document' or source. Hence the indexers do not index on the basis of 'implications, applications, projected uses, future directions' or the like (Miller and Findlay, 1996, p. xiii).

[6] Each document or record is allocated to a single broad subject category – as opposed to multiple descriptor allocation when using the descriptor groups.

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by institutional location).[7] Another decision was made to analyse documents by 'level' of education (such as primary school, secondary, vocational training, university, and so on). A change in focus of this type required considerable computing power, and new and refined search routines involving combining different elements of the databases as well as close analysis of indexing procedures.

Document subject content for the AEI is indexed using descriptors drawn from the Australian Thesaurus of Education Descriptors. In addition to descriptors, the indexers assign 'identifiers' which are proper names or concepts not at the time represented by approved descriptors. Many identifiers become descriptors in future editions of the thesaurus, e.g. 'lifelong education' became a descriptor in the mid-1980s, 'feminist criticism' more recently. For the most comprehensive of searches for a particular area of interest, a person would use descriptors, identifiers, and a text search of the abstracts in the databases.

One form of classification in the AEI is by document, for example, journals, conference papers, and the like. This proved an invaluable method of cross-checking Faculty data with the AEI.

Some desirable sets of analyses proved difficult if not impossible. For example, even using descriptors and identifiers it was not possible to distinguish documents that report research findings (as opposed to those that concentrated on the literature, aspects of design, or contextual background factors). It is safe to assume, however, that the majority of records in the AEI are research related.

Another disappointment was the inability to clearly distinguish between research methods used for the majority of records or documents, even at the broad level of qualitative and quantitative. Such difficulties in teasing out specific sorts of research information were primarily attributable to the variation in indexing procedures over time (including variations made possible by technological change) and the underlying presence of assumptions that were in place very early in the data base history. For example the 'default' research method was quantitative until quite recently, so the indexers did not actually identify the method consistently. Method searches were devised with a heavy emphasis on the use of research technique descriptors and identifiers but the results had to be treated with considerable caution. What was established was a clear growth in qualitative research, practitioner research and critical analysis studies.

The most complete and comparable data series that could be extracted from the AEI was 1992 to 1997 (which allowed aggregation of data for that period). It was established that there was potential for year by year comparison to extend as far back as 1984 for some sets of analyses. As a result it was decided to collect data for the years 1984, 1989, 1992 (to mirror McGaw et al, 1992), and 1997, as well as aggregate data for 1992-1997. For other very specialised smaller searches the period spanned each year from 1984-1997. There are always lags in indexing. During the data base analysis phase the 1997 database was brought fully up-to-date (i.e. all back-indexing was completed, especially with regard to completed student theses). Later comparison with Faculty data for 1997 showed a very close match, likewise it was established through a search of other databases that there were no significant gaps in the AEI for that year.

The third use of the mapping exercise using AEI was to develop a sound knowledge of the contents and procedures of the AEI especially the parameters of the descriptor groupings contained in the ATED.[8]

[7] It should be noted that the original problem encountered when it came to exploring the contribution of universities to educational research, was that institutional affiliation of author(s) was not indexed except for theses.

[8] The *Australian Thesaurus of Education Descriptors* (Miller and Findlay1996) has been developed by the Australian Council for Educational Research (ACER) as a controlled vocabulary for Australian education. The first edition was modelled on the *Thesaurus of ERIC Descriptors* developed by the Educational Resources Information Center of the U.S. Department of Education. Both thesauri group the terms in 41 broad subject groups under nine main categories. The second edition of ATED contains 5,350 terms and provides links to broader, narrower and related terms. It also provides scope notes for guidance of the use of many terms.

The reason for this was so that team members could develop and apply coding categories based on AEI descriptors to the Faculty data set, namely university publications, thesis and grants titles. The only firm and comparable Faculty data was in the form of titles making it difficult to code in a meaningful way unless the coders were highly accurate in their extrapolation from the titles. Analysis of the AEI provided good training for the coders in recognising the many areas and types of educational research. The AEI provided a universally recognised and accepted coding framework as well as the means of cross-checking what might otherwise be a very unreliable data set. During the early coding trials to establish clear coding notes and good inter-rater reliability, it was usually possible to check problem items for the raters against the equivalent AEI entry. In subsequent comparative analyses the pattern match between AEI and Faculty publications and theses was clearly apparent (see Figure 2).

[Insert Figure 2]

The AEI is a national database, and questions were raised concerning its reflection of the broader international field. If articles are published in journals overseas it is always possible they will fall outside the record collection parameters. A proportion of articles about Australian education by Australian or other authors are duplicated across indexes. For 1997 a comparative analysis was undertaken between ERIC and the AEI. The pattern of descriptors obtained was very similar with one exception, namely the area of politics and economics. The general conclusion drawn from that finding was that those who publish outside major Australian journals would seem to be concentrating on topics that are more global and contextual in nature. Bearing in mind the articles represented a specialist sub-set of ERIC records, another interesting finding is the closeness of the match, suggesting high inter-indexer reliability, with associated ramifications for cross-validation of emerging trends, nationally and internationally.

The Faculty of Education document phase

The database phase of the study overlapped with the document collection from faculties of education. The analysis of the Faculty data occurred two-thirds of the way through the whole project, primarily because it proved difficult to obtain these data rapidly and considerable follow-up was necessary to obtain the information. The questionnaire development began shortly after the literature review was completed and initial contact had been made with Faculties. This section concentrates on the Faculty data and its comparison with the AEI data.

As indicated above, in order to develop a reliable and re-usable method to code titles of publications and research projects the decision was made to draw on the already long established and well-known framework of descriptors used in the AEI. This involved two of the team gaining a sound working knowledge of the descriptors and identifiers in the ATED and the rationale behind their grouping.

When publications are indexed in the AEI a number of descriptors are assigned to each item. The challenge with the Faculty data was to code on the basis of title alone using one coding category. With one exception coding categories were nominated that kept as close to the original descriptor groupings as possible, but these were refined, and in some cases narrowed, once immersion in the Faculty documentation occurred. Some slight rewording of descriptor groupings occurred to make them more understandable to a lay audience, and they were renamed 'topic categories' and a category for

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unclassifiable items and items not related to education was added. [9] Ten main topic categories and 30 sub-categories were developed. The coding categories are summarised in the appendix. [10]

The exception noted above was the Curriculum Areas category. In Australia the most common grouping of curriculum are the nine Key Learning Areas. To translate this framework onto the AEI involved the reallocation of curriculum descriptors into the Key Learning Areas. The move was necessary to provide the most useful information in relation to current education policy and curriculum organisation in Australia. This means category 4 comprises the nine standard KLA groups plus a grouping devised to represent tertiary professional development and technical preparation courses (4.10). For the Faculty documentation category 4.10 consisted, in the main, of teacher training topics. Furthermore, some of the publications coded were about tertiary subjects, e.g. biology or French. These were also coded by KLA but were few in number because the vast majority of KLA items were about school level subjects. Topics about literacy were coded with English, and those about numeracy with maths. Curriculum Areas was also the one category where we felt it was possible to allocate more than one code. If a title clearly nominated a KLA subject as well as some other codeable information, it was coded twice. Where necessary, double counting was excluded from subsequent analyses.

Before the Faculty data were coded certain checks were undertaken to make sure there was no double counting of an item within each Faculty. It was too time-consuming to attempt this check across institutions. Hence there is some duplication, but author collaboration was most common within, not across Faculties. There were many trials to obtain high inter-rater reliability in the coding of publication titles (i.e. a consistent 80 - 90% agreement). If there was doubt about an item the AEI database could be used to cross-check and, if a title was obscure but could be accurately coded by recourse to the article in a library, this was done. Details about the Faculty data are presented in Tables 1 and 2.

COMPARISON OF AEI AND FACULTY DATA

Faculty publications documentation (including theses) were collected from all but one of the universities with faculties of education (or equivalent) in Australia for the year 1997. From such information it could be deduced that the AEI under-represents the number of books produced by academics, but is very thorough in journal article collection. In addition the AEI indexed virtually all the theses completed. With respect to conference papers, more than half of the papers produced by education academics in that year were indexed. [11]

Despite the above mentioned differences in the number and distribution of records, in terms of the main descriptor groups, the pattern for AEI and Faculty data was almost identical. The coded Faculty data were very reliable for the main descriptor groups but less reliable for the sub-groupings when compared with the AEI data. This was to be anticipated as the AEI data is allocated several descriptors that capture the finer detail of the article or thesis.

Figure 3 illustrates the correspondence between Faculty publications and the AEI by topics across four types of publication. The degree of correspondence is very high with the exception of two categories,

[9] Publication that were clear enough to be classified but which bore no relationship to educational research amounted to 1% of the total. Total publication titles which were unclassifiable or bore no relation to educational research was 8%. This is almost exactly the same magnitude found in a comparable study of British publications (Kerr et al 1998, 14,48).

[10] Full details of the coding parameters can be found in the technical notes at the end of *Mapping Educational Research and its Impact on Australian Schools* (Holbrook et al, 1999).

[11] This is an area that has been more intensively targeted in the document collection procedures for the AEI in recent years, so the difference will in all likelihood have been further reduced.

namely the curriculum areas, and the smaller area of information and communications. At this stage it is relevant to recall that the AEI draws on all publications including faculties other than education, government sources, the ACER and the like. This largely explains the greater proportion of the total Faculty sources (which is less than 10%) devoted to curriculum area papers. Many small differences between Faculty data and the AEI, including the area of information and communications, indicate the latter's history as an index. For example, the AEI has more information on library and data base management than one finds in publications from Australian faculties of education.

[Insert Figure 3]

The results of the mapping exercise and comparison with Faculty of Education data indicate that the AEI is already a more than adequate and reliable mapping tool and would be even more useful if it included institutional affiliation of the authors concerned. If the latter was included an assay of Faculty output would generally not be necessary again if the purpose was to pinpoint pockets of research expertise and trends by institution. It was reported above that institutional affiliation was obtainable for the BETA data. When this was matched against Faculty data by institutional and category profiles the fit was virtually identical, providing another indication of the confidence with which the AEI could be used. This leads on to a brief look at the clustering of information made possible by obtaining Faculty data.

CLUSTERING THE FACULTY AND AEI DATA BY INSTITUTIONAL CHARACTERISTICS AND TOPIC CATEGORIES

There were gaps in the Faculty data, for example, a few institutions did not provide complete information in key areas. Nonetheless there were many useful ways to combine the publications, major theses and research grants information across institutions. Obvious combinations were by State, by the relative age of the institution, and by research status or profile, known in Australia as the research quantum. It was also possible to use a ranking measure of institutions based on research productivity (Phelan et al 1999).

Further analyses were undertaken to address the relative distribution of research in certain fields, for example, the field of pedagogy. There was no precise way to determine such a distribution, however, an estimate could be obtained by combining or clustering different code or topic categories. A cluster of sub-categories of learning and development were 'learning and perception, individual development and characteristics and disability and special education' (see appendix). The combination of this cluster with 'internal education processes' (categories 1.1, 1.2, 2.1 and 3.1) yielded a grouping that can be described as research focussing on pedagogy.

What could be noted from such analyses were broad pockets of expertise within the overall patterns of research distribution. For example, New South Wales was the state with the largest share of grants in the 'pedagogical' group. Overall more than 40% of theses and grants and some 30% of publications fall within this group.

Category 3.2, 'social and philosophical perspectives', is one of the categories least concerned with pedagogy. This together with 'human society' (category 5) encompasses the majority of sociological studies in education, and comprises about 20% of grants and of theses and 27% of Faculty publications. The state of Victoria accounts for a slightly higher proportion of publications and theses in this grouping than the other states. About 2% of the grouping consists of publications specifically about social problems.

This clustering resulted in findings with the potential to inform discussion on research priorities. For example, one question raised by the analysis was why was there a close similarity in the overall distribution between categories by state for publications and theses that is not duplicated in the pattern

of grants. The grouping of institutions by research quantum ranking resulted in little correspondence between thesis, grants and publications activity, indicating that its usefulness would be limited in distinguishing education research expertise. Another finding indicates that because every state is involved in a similar overarching pattern of research, postgraduate students (and schools for that matter) can link into essentially the same broad research areas around the country. Yet the cluster of institutions that ranked high on the productivity measure dominated research across all categories, particularly with respect to proportion of PhD students. Hence one prominent indicator of research expertise would appear to be the clustering of postgraduate students. This finding is interesting in that it seems to be at odds with the known lack of mobility of such students in Australia, and the accessibility and similarity of programs across the country.

PERSPECTIVES ON THE USE OF EDUCATIONAL RESEARCH – THE QUESTIONNAIRES

Much of the literature concerned with knowledge utilisation suggests that a range of people and organisations provide a linking and integrating function between the worlds of research and practice. Linkage agents assume considerable importance in summarising and interpreting the findings of educational research in ways that make them more accessible to practitioners. As a result of their roles linkage agents provide important perspectives on the impact of research.

Different perspectives on the impact of research on schools and schooling were obtained from four groups of respondents: namely postgraduate students, professional associations, school principals, and school system senior policy makers. The first three of these groups were administered questionnaires with common components for cross-validation and to obtain their different perspectives. It was not considered appropriate to go to the same level of detail with the system policy makers. They were interviewed in a less-structured way with a focus on their use of and attitudes to research, defined as systematic educational enquiry.

In the following sections, the samples obtained from each of the first three groups are described, then the questionnaires are outlined, with a focus on the common components. Information on the sample of system policy makers and a brief summary of their responses are then given.

Postgraduate students

Postgraduate students, particularly those working in the education and training sector, have the potential to be a key group in linking research in faculties of education and the activities of schools and other educational institutions. The idea that exposure to research affects the beliefs and practices of teachers has received support previously (Green & Kvidahl, 1990; Zeuli, 1992). Not only are postgraduates exposed to university research activities, but also many become researchers, at least in the short term, through project work and through writing theses. In addition to creating research information, many would be involved, either during or subsequent to their postgraduate work, in disseminating and diffusing research in both formal and informal ways. It could also be expected that their studies would lead many to use research findings in their professional roles.

Questionnaires were sent to postgraduate students in education in all States and Territories of Australia in the latter half of first semester, 1999. The students were approached indirectly through their faculties because, for privacy reasons, most universities would have been unwilling to provide their students' names and addresses without the students' prior permission. All 36 universities with a Faculty/School/Department of Education were asked to forward a questionnaire to each of their postgraduate students if they had up to 100 such students, and to randomly select 100 students across the range of postgraduate degrees they offered if they had more than 100 eligible students. One university found itself unable to do this, so the potential sample of postgraduate students was no more

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than 3500. However, as some universities would have had fewer than 100 postgraduate students in education, the potential sample was estimated to be about 3100 students.

Useable responses were received from 1267 postgraduate students, a response rate of only 41% of the estimated potential sample. This was disappointing, but it was also of interest to estimate the achieved sample as a proportion of all postgraduate education students in Australia. The most recent statistics available were for 1998 and comparable information was available only for students undertaking doctorates and masters degrees, whether by research or coursework (DETYA, 1998). As postgraduate diploma and certificate qualifications had been classified differently by the universities, these students were omitted from this estimate. The sample of doctoral and masters degree students in the present study in 1999 was 11% of the total number of these students in 1998. Given the increasing application of tuition fees for coursework masters degrees between 1998 and 1999, we believe that the overall numbers of postgraduate students would have declined somewhat in that time. Some students may have undertaken research degrees rather than coursework degrees for this reason, but others would simply have not proceeded with their postgraduate study plans. Thus it is likely that the sample exceeded 11% of the population of postgraduate students in education.

It was also necessary to check the extent to which the achieved sample represented the States. With one exception, the six States and two Territories were represented approximately as expected, given their populations. As the State including the one major university which was unable to participate effectively, Victoria had a lower proportion than expected of the national sample.

The questionnaire had three major focuses. Firstly, it requested detailed background personal and employment information about postgraduate students in education. Secondly, it sought their views of the sources and importance of research, and on their research interests (and research topic if they were engaged in a research project).[12] Finally, it covered the views of postgraduate students regarding the usefulness of their studies as well as their views of the impact of educational research more generally.

Subsequently, 24 of these postgraduate students from the group who had indicated their willingness to do so, were interviewed by telephone to provide more detailed information on their motivation to study and their use of their postgraduate studies in the workplace.

Professional associations

Professional associations in education provide a range of services to their members and fill a number of roles that link research-based knowledge to the world of practice. For that reason the project explored the perspectives of professional associations on educational research and its providers, recognising the variation that exists among these associations and especially in the extent to which they have direct contact with schools and schooling and to research. Information about that variation is important in itself. It was expected that, most commonly, associations would disperse information about research to their members principally through formal dissemination in conferences and publications, but also through less formal diffusion in meetings and during networking. A less likely function was considered to be an actual use of research in furthering the objectives of the association. In a few cases it was expected that associations would, as a matter of policy, create new research through the setting up of task forces from their membership.

The *Australian Education Directory 1999* (ACER, 1999) was used to identify a total of 146 national professional associations with an interest in education. Through the secretary, each association was asked to complete a questionnaire on the association's perspectives on research. A total of 72 of these associations provided useable information. Correspondence indicated that at least seven of the original 146 associations had ceased to function, at least temporarily, suggesting an effective response rate of

[12] The profile of research projects differed somewhat from the national profile obtained from Faculty data and from BETA, with a greater emphasis on the areas of human society, and politics and economics.

52%. Given that not all the educational associations have a specific interest in educational research, the response rate was judged to be reasonable and, given the other demands on the time of association office bearers, indicative of considerable interest in research issues at association level.

The first section of the questionnaire sent to associations was concerned with the roles of the association. The second section covered the sources and responsibility for generating new ideas and developments, and any other experience of research initiatives. The latter section was common to the questionnaire given to postgraduate students and the interview with school principals.

School principals

In considering the relationship of the school principal to research, it is important to take into account the research functions of creation, dispersion (including both diffusion and dissemination), and use of research on the one hand, and the wide-ranging educational and administrative roles of the school principal on the other. The major research roles for principals are related to dispersion and use of research.

A total of 90 schools was selected at random, 30 schools from each of three States across the three sectors of government, Catholic and other non-government schools. The states selected were Western Australia (with a response rate of 77%), Victoria (80%), and Queensland (87%), giving a total of 73 schools (an overall response rate of 81%).

One-third of the schools responding were primary schools (33%), almost half (46%) were secondary schools, including four senior colleges, and slightly more than one-fifth (21%) were schools catering for K-12 students. The achieved sample was made up of responses from government schools (53%), Catholic schools (19%), and other non-government schools (28%). This sample somewhat under-represents government schools and over-represents other non-government schools.

The principals, or their nominee, responded to a series of structured questions administered by telephone that enabled the interviewer to complete a six-page questionnaire. Questions first sought information about the respondent's school and staff numbers and qualifications. Among the other questions were those also asked of postgraduate students and professional associations. They concerned the sources and responsibility for initiating new ideas and developments, and other experience of research. The final questions related to more specific school contacts with research in general and universities in particular.

A brief summary of common elements in the questionnaires

As stated above, common items were used on the postgraduate student, professional association and school principal questionnaires. This was done to obtain a range of professional perspectives on research and, to some extent, to cross-validate responses. The common elements focussed, first, on the importance of different sources of research information unpinning a range of new developments, and the type of information on which the development was based. Secondly, they focussed on the respondents' understanding and acceptance of research and their estimate of its impact on education.

Important sources of new developments

Seven potential sources of the research underpinning new developments were offered to the three groups of respondents. The sources were colleagues within and colleagues outside their institution, professional associations, universities, publishing houses, professional consultants, and head or regional office. In summary, all groups most frequently saw colleagues within their school or association as very important or important for the development. Colleagues outside the organisation were seen as only slightly less important sources. Clear majorities of postgraduate students and professional associations saw universities as important, whereas only a minority of principals (44%) responded in

this way. Perhaps not surprisingly, the principals also more frequently saw the head or regional office (69%) and particularly their professional association (81%) as important sources.

In addition to the seven potential research sources offered to all three groups, the school principals were offered an additional source - government. This was done in response to information gained from instrumentation trials for the study when principals were inclined to distinguish between initiatives of the Education Department in the State concerned, and of government more generally. The majority (59%) also saw the two levels of government (State and Federal) as important sources of new developments.

To take these indications of importance a little further, it was considered that the relative importance of research sources would be related to the nature of a new development identified by respondents, and would be particularly of interest for those respondents associated with the schools. For example, head office may be seen as more important for curriculum developments, while the universities may be seen as more important for computing in schools. To investigate this possibility responses to two questions were combined for postgraduates and for principals, the two groups most closely associated with the schools. The first-mentioned new development by each respondent was tabulated against the importance by research source. As would be expected, there was a large number of different developments listed, but the six most frequent for postgraduates were curriculum, computers, learning and teaching, student welfare, administration, and assessment and evaluation. Only the first four of these were rated as important by at least 10% of the principals.

As an illustration of the nature of the data obtained in this part of the study, the types of development by source is shown in Table 3 for the largest group, that is, the postgraduate students.

Table 3. Postgraduate Students: Frequency of Important Research Sources by Type of New Development

Type of new development[a]	Percentage Importance of Sources for Postgraduate Students in Education[*]						
	Head Office	University [•]	Profess. Association	Consultant [•]	Publisher	Internal Colleague	External Colleague
Curriculum	54	63	74	41	44	88	76
Computers	42	78	81	42	44	83	80
Learning & teaching	43	70	76	55	50	75	83
Student welfare	55	75	79	61	58	91	83
Administration	53	68	77	52	51	88	81
Assess. & evaluation	47	50	71	61	63	82	73
ALL AREAS	49	66	74	52	52	84	79

[a] A total of 835 postgraduate students gave details of at least one new development.

[*] Percentages shown are the sum of the percentages of respondents rating a source as either important or very important.

[•] Denotes sources that included differences significant at the 5% level using a chi square test.

Summarising from the viewpoint of type of development rather than by research source, the following patterns are evident from the postgraduate students' responses.

Curriculum. The major sources for curriculum developments were colleagues and, interestingly, professional associations.

Computers. For educational computing, the major sources of information were school colleagues, professional associations and universities.

Learning and teaching. The most common sources of information were colleagues, professional associations and universities.

Student welfare. The most common sources were colleagues, professional associations and universities.

Administration. The most common sources were colleagues and professional associations.

Assessment and evaluation. By far the most common source was colleagues at the respondent's school.

Type of information on which new developments were based

Respondents were asked to select, from a short list of four alternatives, one type of information on which they believed the new development they had specified was based. One of the alternatives was research and, if this alternative was selected, the respondent was asked to indicate the level of that research (local, State, national or international). Approximately 63% of each group was able to indicate a type of information which had been a basis for a development. In addition to those who did not answer this question, 13% of the professional associations and 6% of the postgraduate students responded that they were unable to tell the type of information on which the development had been based.

The responses for those indicating research as the base for the new development were dispersed through four categories in this question: these were local, state or national, international and unspecified research. Thus the total for research as the basis reported by postgraduate students was 44%, by professional associations was 36%, and by school principals was 30%. Accumulated wisdom and practical experience cited as a base for the development was comparable with the total for research for professional associations and principals, but less for the postgraduate group.

When the importance of the different levels of research was considered for the three groups, state and national research, and international research were considered to be more important than local research or unspecified research. However, there were differences between the three groups in the relative importance of state and national research and international research. Whereas the postgraduate students saw state, national and international research as approximately equal bases for the new developments, the professional associations clearly saw state and national research as more important, while the school principals saw international research as very much more important.

These results suggest that participation by teachers and other educators in postgraduate studies is associated with an increased awareness and use of research in schools. Interpretations of this association need to allow for the possibility that those most disposed to seek and use research-based information will also be those who are most inclined to enrol in postgraduate study. There is probably a range of ways of nurturing a culture of continuous professional development among teachers. Encouragement of postgraduate study is an important way of contributing to that culture for some teachers.

Awareness and impact of research

A clear majority of all three groups provided evidence of an awareness, acceptance and valuing of research. These data are based on a series of five items that sought information from the three groups

about the awareness and receptiveness of research, and of the impact of university research. School principals particularly claimed awareness of the research origins of new developments (92%), while professional associations had the strongest view of the receptiveness of their colleagues to new ideas based on research (91%). Although still a majority (61%), a lower proportion of the postgraduate students, compared with the other two groups, thought their colleagues were receptive to new ideas based on research. Similarly, a lower proportion of school principals, although still a majority (61%), believed that research had at least some impact on their own activities.

Again if greater use of research in schools were desired, it would be important to investigate how more research collaboration could be achieved. One requirement would be a greater emphasis on and provision of opportunity for university staff in faculties of education to work with schools. This would mean a change of priorities in allocation of academic staff time and recognition within universities.

Policy maker perspectives on research

Since government school system authorities have substantial influence on educational policy and practice in Australia, it was considered likely that the impact of research on schools and teachers would be affected by the structures, policies and attitudes of those in head offices of state education departments. Research therefore can have an impact on schools, not only through the direct take-up of new ideas and findings by principals and teachers, but also through developments initiated by school system policy makers that are derived from research, and through information that is disseminated to schools by the system. It was also considered that similar influences on the use of systematic educational enquiry might operate through the coordinating organisations in the non-government sector.

Interviews were conducted with senior policy makers in seven of the eight government school systems and a national association of non-government schools. The general aim was to obtain a comprehensive overview of the current use, impact of and attitudes to systematic educational enquiry in the system concerned. Three major topics formed the basis of these interviews: the influence of systematic educational enquiry on policy development at system level; the perceived influence of systematic educational enquiry on schools; and the importance of graduate studies for teachers. For each of these major topics a series of issues was specified to focus the interviews.

The structured interview schedule was sent to each respondent in advance, together with a card outlining the major types of systematic educational enquiry defined for the project. The types defined were traditional knowledge production, applied research, policy and program evaluation, user-oriented action, and consultancy. Some interviews were conducted in person, others by telephone. Some interviews were with an individual officer, in others two or three officers were present. The interview information was supplemented by collecting and reviewing policy documents. As a means of examining trends and themes across the systems, the information from each system was entered into a two-dimensional matrix from which findings were extracted, in accordance with principles of qualitative data reduction (Miles & Huberman, 1994).

Impact at the system level

All respondents were able to nominate an example of how systematic educational enquiry had recently affected policy making in their system. But no single piece of research was nominated by more than one respondent. Not only does this illustrate a degree of diversity in research interests among states and territories at this time, but it may reflect the view that systems should not respond to the results of individual research projects, but only to a larger body of evidence. It was commented that schools only accept policy changes that are strongly evidence-based. Some of the studies nominated had been specifically commissioned by the state or territory to inform a major policy direction or shift.

Bringing educational research to bear on policy decisions involves the notion of linkage (Havelock, 1971). For departments of education to establish effective links, senior managers need to have a comprehensive knowledge of who has the relevant expertise, whether they are inside or outside the department. They also need a motivation to use such knowledge in their field of influence. There were differences between state systems and within branches of state systems in the commissioning and use of research.

Influences of systematic enquiry on schools

There was unanimity among respondents in support for the user-oriented action model of systematic educational enquiry. It was seen as having immediate benefits, and thus involving teachers. There was, however, concern about the quality of some research in this mode. While external expertise can provide support, quality of data and its management can only be guaranteed when schools have staff with the appropriate skills, and a time allocation to undertake school-based research and evaluation. This view is consistent with the results of a recent analysis of action research in schools (Lambert, 1999).

These views could, however, be contrasted with opinions expressed by policy officers of the essential nature and direct impact of large-scale, quantitative research at a macro level. It was considered to be unrealistic to expect teachers and administrators in schools to keep up to date with the skills required for this type of educational enquiry. But they do need access to expertise to make this possible for their system.

Importance of graduate studies for teachers

There was overwhelming support among respondents for the notion of graduate studies for teachers. It was seen as the major form of professional development, especially for those who were potential leaders in schools. It was considered that employing authorities should not only make it possible for teachers to undertake graduate work, but that they should encourage this actively. In particular a stronger emphasis was advocated for small-scale, well-designed research projects which would facilitate the transfer of research skills to the schools.

In summary, there emerged a strong interest in using the results of systematic educational enquiry, and of encouraging research and evidence-based policy and practice. Within that general picture there is a much greater interest in applied research and evaluation and a disposition to support the shifts that have occurred to those forms of enquiry. What also emerges is a need to support and build on the structures that are emerging whereby educational authorities interact more extensively with researchers and use the results of systematic enquiry.

Summary of perspectives on research

The four groups of respondents - postgraduate students, representatives of professional associations, school principals, and policy makers - provide a range of perspectives on educational research, particularly that done within faculties of education. As a group the postgraduate students have the closest ties with university staff and with research undertaken in faculties of education, being producers of much of the research themselves. Most school principals would also have contact with education faculties through themselves or their staff undertaking further studies, through practice teaching and internship of pre-service teachers, and as potential consumers of research in their professional roles. The professional associations are a much more varied group. In some cases they are intimately involved in supporting and using research, in other cases, educational research would be marginal to their pursuits. Many of the professional associations had a particular focus on curriculum, which may or may not have had a research focus. The policy makers were also students as well as clients and collaborators.

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It is necessary to be aware of the differences and similarities between these groups when considering and comparing their answers to the similar items in the questionnaires and interviews to which they responded. The overall impression gained is the consistency of responses in some comparisons, and the differences in others. Colleagues, particularly those within the institution where the respondent worked, were most frequently the important sources and the initiators of new developments. University faculties of education were viewed as among the more important by both postgraduate students and professional associations, but not by school principals. There was consistency across all groups in that clear majorities thought that university research had an impact on their own activities and on education in general. Again there were differences within this overall similarity with postgraduate students responding that their own activities were more often affected than those of education in general, professional associations seeing the frequencies as similar, and school principals more frequently seeing impact on education in general than on their own activities.

The most common area of development for each of the first three groups was consistently curriculum content. As the curriculum area was also strong in the Faculty mapping exercise (see Tables 1 and 2), these two findings provide mutual support. The other more frequently nominated areas differed between the groups. However, when research was pitted against accumulated wisdom and practical experience as the potential bases for new developments, the groups did differ considerably. The postgraduate students rated research much more highly than accumulated wisdom/experience, the professional associations rated both similarly, and the school principals rated wisdom/experience somewhat more highly than research. These consistencies and differences suggest that all perspectives should be heeded when considering the importance of research to educational institutions.

CONCLUSIONS

This paper has provided a detailed overview of the multiple methods used in a study of the impact of educational research in Australia, with a particular emphasis on the more innovative features of research mapping, and links between responses from different groups on their perceptions of impact of educational research.

The study indicated it was possible to use an existing database, with relatively minor changes, to monitor educational research in Australia. This being the case, regular monitoring of research becomes possible without it becoming a major and therefore expensive exercise. For example, there may be no further need to approach faculties of education for this type of data to continue monitoring the nature and extent of educational research in the system.

When data were clustered on the bases of existing categorisations of institutions, there were some expected and some unexpected findings. The latter raised new questions about the distribution of research practice and expertise in education. Consequently the dangers of assumptions about the distribution of research were evident. Also any exercises in simple data collection and consequent priority setting would be extremely problematic.

A limitation of the study was that none of the data sets was complete. This situation, although regrettable was also unavoidable, and not unexpected. However, the data collected were considerable and found to be representative by means of several layers of cross-checks. It was judged that the data were sufficiently sound to allow of some generalisations concerning educational research in Australia.

Another limitation of the study was the reliance on perceptions of research use and usefulness, rather than some more objective measure. However, the perceptions obtained were those of the dominant stakeholders. Given that one of the bases for denigration of educational research is the view expressed by some practitioners that it is not useful, perceptions are important in any case. The perceptions recorded in this study challenge the accuracy of this view being accepted as the most dominant one.

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The links between research and its use in schools and departments of education were explored through multiple perceptions. Given that postgraduate work is a major source of research in Australia and that postgraduate students are, in the main teachers, these research links are likely to be particularly important in this respect. Such links should be a priority focus area for future research, specifically because of its implications for the future of practitioner research in Australia. There was no intent to evaluate the quality of research in any way independent of its use as perceived by educational practitioners.

The McGaw report (McGaw et al 1993) indicated that there was considerable scepticism among practitioners and policy makers about the usefulness of educational research. More recently a small study by Saha and Biddle suggested that school principals found research useful (Saha & Biddle 1995). The present study seems to have picked up on what might be called a 'sea change' in attitudes towards research suggesting a greater connectedness than previously between the research and school communities. The confluence of an interest in monitoring educational research, having the tools to do so, and favourable attitudes towards research and practitioner involvement in it, bodes well for future improvement and innovation in education.

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APPENDIX: Summary of the Database Descriptors

Main Descriptor Group* (Topic Categories)**	Sub-Groups of Descriptors (Topic Sub-Categories)
1.0 **Learning & Development**	1.1 Learning and Perception *Learning, conditioning and reinforcement; cognition and thought processes and perception* 1.2 Individual Development and Characteristics *Attributes of the individual, i.e. psychological characteristics, aptitudes, abilities, behaviour, needs and attitudes; growth and development; age groups; and individual differences.*
2.0 **Physical & Mental Conditions**	2.1 Disability and Special education *Physical and mental disabilities, special education, communication disorders, processes and therapies, equipment and personnel serving the disabled.* 2.2 Counselling *Guidance and counselling, guidance personnel, counselling techniques, and rehabilitation.* 2.3 Other health and well-being *Mental illness, therapies promoting mental welfare and mental health, mental health facilities & personnel, medicine and health, health occupations, facilities, parts of the body, health conditions services and diseases.*
3.0 **Education Processes & Structures**	3.1 Internal educational processes *Procedures and processes characteristic of the classroom, and education institution i.e., teaching systems, methods, classroom environment and management, student/teacher behaviour and interaction; internal policy and personnel, curriculum and program development, student/school and teacher/administrator relationships. (includes structural features/systems features of all levels of education)* 3.2 Societal and philosophical *perspectives* on the educational process (includes role of agencies, groups, participants) *Focus on procedures and processes pertaining to educational institutions in 'context' (social, historical, environmental, philosophical), looking at school, community and society at large, including those who study them; roles, impacts, relationships between institutions including connections with work and family, large 'P' policy, departments, opportunities, accessibility.* 3.3Curriculum organisation, educational levels and qualifications *units and sequences around which curriculum and teaching are organised, attributes of curriculum structures as defined by time, sequence, special location and other organisational structures; forms and levels of education, credentials and awards, entry requirements.*
4.0 **Curriculum Areas**	Specific subject matter areas at all 'levels' of education. 4.1 English (inc. literacy) 4.2 Mathematics (inc. numeracy) 4.3 Science 4.4 LOTE 4.5 Study of Society and Environment 4.6 Technology 4.7 The Arts 4.8 Health and Physical education 4.9 Other KLA and Misc. e.g. driver education, VET in schools 4.10 Professional devt & technical preparation at tertiary level ***

Appendix Summary of the Database Descriptors (Continued)

Main Descriptor Group* (Topic Categories)**	Sub-Groups of Descriptors (Topic Sub-Categories)
5.0 **Human Society** *(About the fabric and framework of social life. Forces outside the education sector that have a bearing on education including educational activity at the domestic level)*	5.1 The individual in social context and social processes and structures Familial and other social influences on individuals/groups, social attributes of individuals/groups, cultural attributes, value systems structures, relationships. 5.2 Social problems and bias and equity The focus here is problematisation. Prejudice, stereotypes, segregation, opportunity, specific behavioural and social problems and groups defined by the above. 5.3 Human geography and Cultural groups demographics, ethnic/racial/religious groups
6.0 **Politics & Economics** *As with 5.0: forces, structures and conditions outside the education sector that have a bearing on education, including educational activity in the workplace.*	6.1 Government and Politics 6.2 Economics and Finance 6.3 Labour, Employment and Workplace *includes skills levels and labour force characteristics, workplace conditions, on site training, apprenticeships and traineeships, personnel management, psychosocial factors pertaining to work.*
7.0 **Information & Communication Systems and the Media**	*Library and information services and systems, information and communications technology and products, different media, computer software and evaluation*
8.0 **Research** *The processes of research, including critique, trends, specific methods*	8.1 Research and theory 8.2 Methods, instruments and analytic techniques
9.0 **Facilities and Equipment**	*Infrastructure, architecture, space use, special equipment, supplies*

Notes

* The word descriptors is used in line with the nomenclature of the AEI. When dealing with Faculty data descriptor is replaced with 'topic category' to reflect that the method of using modified AEI descriptors to code publication titles by 'topic'.

** The descriptor headings are not exactly the same as in the *Thesaurus*. 6.0, 7.0, and 8.0 and were altered slightly to improve clarity. As indicated in the paper there was the need to have the same categories for Faculty and AEI data for purposes of comparison. When coding Faculty data a tenth category was added, namely 'Other', wherein 10.1 represents 'Classifiable but with no bearing on education', and 10.2 represents 'Unclassifiable'

*** An example of professional development and technical preparation at tertiary level is specific subjects for teacher education.

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Table 1. FACULTY DATA 1997: FREQUENCIES OF EDUCATION PUBLICATIONS, PROJECTS AND THESES BY TOPIC AREA

This table details the numbers of research inputs and outputs in the three major categories for each of the ten major topic areas for all universities that provided 1997 data. Each of the three categories: publications and conference papers; grants, projects and consultancies; and theses; have five sub-categories. As indicated in the table, it should be noted that there were a few categories where several universities were unable to provide information. These were unfunded projects (within the grants category) and minor theses.

Education Publications, Projects and Theses by Topic Area: All Universities in 1997

	PUBLICATIONS/CONFERENCES						GRANTS/PROJECTS						THESES					
TOPIC AREA*	Book	Chap	Jour	Conf	Othr	TotP	ARC	OthG	ConT	UnF#	UnK	TotGP	PhD	MEd	EdD	OPG#	UGH #	TotT
1	14	36	134	191	29	404	29	34	15	12	9	99	36	14	5	33	5	93
2	22	22	102	92	30	268	6	19	19	11	11	66	16	11	1	30	2	60
3	101	252	656	903	178	2090	83	109	179	60	83	514	103	65	25	80	10	283
4	60	115	366	611	142	1304	47	63	99	38	57	304	58	38	8	49	15	168
5	18	49	152	169	76	464	14	15	26	6	15	76	15	13	-	30	7	65
6	13	20	61	82	33	209	9	16	42	4	14	85	8	4	-	6	1	19
7	11	8	20	49	10	98	2	3	7	4	6	22	9	-	-	2	-	11
8	14	49	111	178	42	394	16	12	23	5	15	71	6	5	-	9	1	21
TOT1^	**253**	**551**	**1602**	**2275**	**540**	**5231**	**206**	**271**	**410**	**140**	**210**	**1237**	**251**	**150**	**39**	**239**	**41**	**720**
9	2	-	-	3	-	5	-	-	-	-	1	1	-	-	-	-	-	-
10	22	38	183	134	110	487	9	13	28	11	7	64	3	2	-	2	2	9
TOT2^	**277**	**589**	**1785**	**2412**	**650**	**5723**	**215**	**284**	**438**	**151**	**218**	**1302**	**254**	**152**	**39**	**241**	**43**	**729**

* Topic areas:
1. Learning and development
2. Physical & mental conditions
3. Educational processes & structures
4. Curriculum areas
5. Human society
6. Politics and economics
7. Information & communications systems & media
8. Research
9. Facilities & equipment
10. Unclassified/Unrelated

* Category

Publications: Book=Books;Chap=Chapters; Jour=Journal articles; Conf=Conference papers; Othr=Other publications; TotP=Total publications

Grants/projects: ARC=ARC grants; OthG= Other grants; ConT=Consultancies & tenders; UnF=Unfunded projects; UnK=Funded project, but grant source unknown; TotGP=Total grants/projects

Theses: PhD=PhD theses; MEd=MEd theses; EdD=EdD theses; OPG=Other postgraduate theses; UGH=Undergraduate honours theses; TotT=Total theses

These are categories of projects and theses for which many universities were unable to provide information (see text).

^ TOT1 is the total number in each category for topic areas 1 to 8 inclusive, with duplicates removed. In the main, this was the number used for calculations in chapter 4.

^ TOT2 is the total number in the category for all topic areas 1 to 10 inclusive.

Table 2. FACULTY DATA 1997: PERCENTAGES OF PUBLICATIONS, RESEARCH GRANTS, THESES BY SUB-CATEGORY

Table 2 is complementary to Table 1 in that it provides for 1997 greater detail of the distribution of total proportions of publications/conference papers, research grants/funded projects and major theses (both completed these and those in progress) by sub-categories within topic areas. It should be noted that the areas where some universities were unable to provide information for 1997 – namely unfunded projects/consultancies and minor theses – have been excluded from this table. For reasons of space, the 30 sub-categories have been listed only by number in the table – the sub-category code names and detailed descriptions were given earlier in this Appendix.

Table 2. Percentages of Publications, Research Grants, Theses by Sub-Category

TOPIC AREA SUB-CATEGORY	PUBLIC-ATIONS %	RESEARCH GRANTS %	COMPLETED MAJOR THESES %	MAJOR THESES IN PROGRESS %
1.1	4.6	4.6	9.7	7.8
1.2	2.4	2.1	3.0	3.5
2.1	2.7	3.2	2.8	3.9
2.2	0.6	0.1	0.2	0.8
2.3	2.8	1.1	3.4	2.3
3.1	16.9	23.0	23.7	25.2
3.2	16.3	12.5	14.7	12.7
3.3	2.5	4.8	3.7	2.3
4.1	4.3	7.3	5.5	5.7
4.2	5.4	4.1	4.6	3.4
4.3	3.8	2.3	3.2	1.6
4.4	0.7	1.7	1.4	2.7
4.5	1.9	1.4	2.5	1.5
4.6	0.8	0.9	1.6	0.7
4.7	1.3	1.4	2.1	3.1
4.8	0.7	0.9	0.5	0.4
4.9	0.6	0.5	0.5	0.4
4.10	3.0	2.6	2.1	1.3
5.1	5.0	3.5	5.3	5.2
5.2	2.4	1.5	1.4	0.8
5.3	0.5	0.8	0.5	0.9
6.1	0.3	0.6	0	0.3
6.2	0.2	0.5	0.2	0.1
6.3	3.3	6.1	2.5	5.2
7.0	1.7	1.6	2.1	0.8
8.1	3.6	1.7	1.6	1.5
8.2	3.1	4.1	0.9	2.1
9.0	0	0.1	0	0.1
10.1	1.1	0.6	0.4	1.0
10.2	6.9	4.1	0	4.9

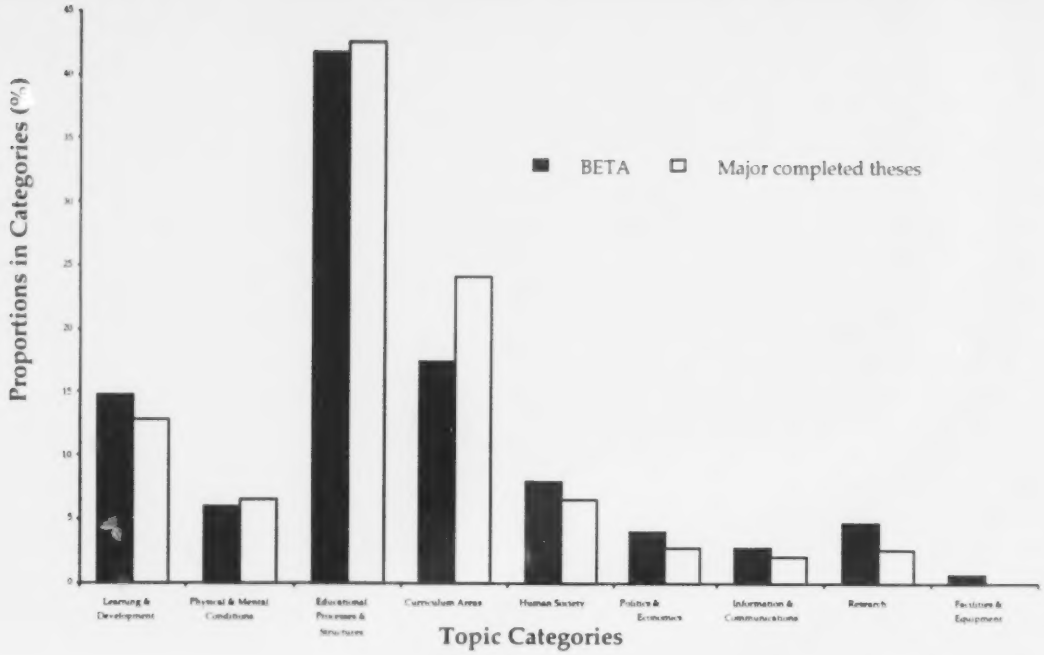

Figure 2. Main Category Comparison BETA and Completed Major Theses

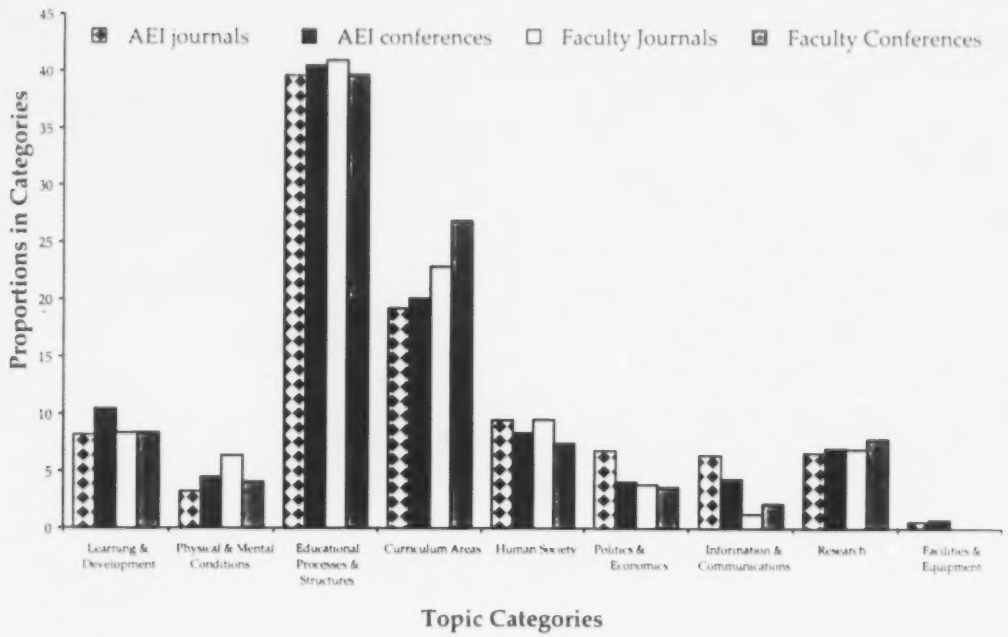

Figure 3. Main Category Comparisons: AEI and Faculty of Education Journals and Conferences

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